

AP20 Rec'd PCT/PTO 21 APR 2006
Description

WINDOW TYPE AIR CONDITIONER

Technical Field

[1] The present invention relates to a window type air conditioner, and more particularly, to a window type air conditioner capable of minimizing the entire size thereof with maintaining an air volume of an outdoor unit.

Background Art

[2] In general, an air conditioner is provided with a refrigerating cycle constituted with a compressor, a condenser, a capillary tube, a heat exchanger, etc., and properly supplies cool air generated from an evaporator and warm air generated from the condenser indoors according to the indoor condition, thereby maintaining the indoor circumstance comfortably.

[3] The air conditioner is divided into a window type air conditioner and a separated type air conditioner according to an installation method. The window type air conditioner is installed at the window, etc. under the state that an outdoor unit and an indoor unit are integrally assembled in one case, and the separate type air conditioner is respectively installed at the outdoor and the indoor under the state that the outdoor unit and the indoor unit are separated from each other.

[4] FIG. 1 is a disassembled perspective view showing a window type air conditioner in accordance with the conventional art, and FIG. 2 is an engagement sectional view showing the window type air conditioner in accordance with the conventional art.

[5] The conventional window type air conditioner comprises: a case 102 of which one side is positioned at the outdoor side and another side is positioned at the indoor side; an outdoor unit 104 installed at the outdoor side of the case 102 and heat-exchanged with the outdoor air; and an indoor unit 106 installed at the indoor side of the case 102 and heat-exchanged with the indoor air.

[6] The case 102 is installed at the wall that divides the outdoor and the indoor, and one side of the case 102 is positioned at the outdoor and another side thereof is positioned at the indoor. An outdoor air suction port 108 for sucking outdoor air is formed at both lateral surfaces of the case 102 positioned at the outdoor side. Also, an outdoor air discharge port 110 for discharging the air heat-exchanged while passing through the outdoor unit 104 outdoors is formed at the rear surface of the case 108. At the front surface of the case 108 positioned at the indoor side, an indoor air suction port 112 for sucking the indoor air and an indoor air discharge port 114 for discharging

the air heat-exchanged while passing through the indoor unit 106 indoors are respectively formed.

[7] The outdoor unit 104 is installed inside the case 102 positioned at the outdoor side. The outdoor unit is composed of: an outdoor heat exchanger 120 connected to a compressor 116 by a refrigerant pipe thus to be heat-exchanged with the outdoor air; and an axial fan 122 opposite to the outdoor heat exchanger 120 for generating a blowing force to suck the outdoor air and thus to discharge it to the outdoor heat exchanger 120.

[8] The case 102 positioned at the outdoor side is provided with a shroud 126 where the axial fan and the outdoor heat exchanger are mounted. The shroud 126 is provided with an orifice 128 for guiding air to the axial fan 122 for a smooth suction.

[9] The indoor unit 106 is composed of: an indoor heat exchanger 130 installed inside the case 102 positioned at the indoor side and connected to the compressor 116 by a refrigerant pipe 124 thus to be heat-exchanged with the indoor air; and a centrifugal fan 132 opposite to the indoor heat exchanger 130 for generating a blowing force to suck the indoor air and thus to discharge it to the indoor heat exchanger 130.

[10] An orifice 134 for guiding the air that has passed through the indoor heat exchanger 130 to the centrifugal fan 132 is formed between the indoor heat exchanger 130 and the centrifugal fan 132. An air guide 136 for guiding the air that has passed through the centrifugal fan 132 to the indoor air discharge port 114 is installed at the upper side of the centrifugal fan 132.

[11] A division plate 150 for dividing the outdoor unit 104 and the indoor unit 106 is installed inside the case 102, and a driving motor 152 for driving the centrifugal fan 132 and the axial fan 122 is mounted at the division plate 150.

[12] Operation of the window type air conditioner in accordance with the conventional art will be explained in more detail. When a power source is applied to the air conditioner, the compressor 116 and the driving motor 152 are driven thus to heat-exchange the outdoor air at the outdoor unit 104 and to heat-exchange the indoor air at the indoor unit 106.

[13] More specifically, when the axial fan 122 is driven, the outdoor air is sucked through the outdoor air suction port 108 thus to be heat-exchanged while passing through the outdoor heat exchanger 120. Then, the outdoor air is discharged outdoors through the outdoor air discharge port 110.

[14] When the centrifugal fan 132 is driven, the indoor air is sucked through the indoor air suction port 112 thus to be cooled while passing through the indoor heat exchanger

130. Then, the indoor air is discharged indoors through the indoor air discharge port 114.

[15] However, in the conventional window type air conditioner, the outdoor air suction port 108 is formed at both lateral surfaces of the case 102, the outdoor air discharge port 110 is formed at the front surface of the case 102, and the axial fan 122 of a great air volume having a low flow path resistance is used to blow the outdoor air. According to this, a comparatively wide suction space has to be obtained in order to reduce the flow path resistance of the outdoor air suction port 108 and the outdoor air discharge port 110, so that the size of the air conditioner is increased.

Disclosure

[16] Therefore, it is an object of the present invention to provide a window type air conditioner capable of preventing an air volume lowering due to a flow path resistance by applying a centrifugal fan at an outdoor unit and capable of minimizing the entire size thereof.

[17] To achieve these objects, there is provided a window type air conditioner comprising: a case of which one side is positioned at an indoor side and another side is positioned at an outdoor side; an indoor heat exchanger mounted inside the case positioned at the indoor side thus to be heat-exchanged with the indoor air; an indoor centrifugal fan opposite to the indoor heat exchanger for generating a blowing force so that the indoor air can pass through the indoor heat exchanger; an outdoor heat exchanger mounted inside the case positioned at the outdoor side thus to be heat-exchanged with the outdoor air; and an outdoor centrifugal fan opposite to the outdoor heat exchanger for blowing the outdoor air by a centrifugal force.

[18] The outdoor centrifugal fan is composed of: a hub connected to a driving motor by a rotational shaft; blades formed at the outer side of the hub in a circumferential direction with the same interval for generating a blowing force; and a supporting ring mounted between the blades for supporting the blades.

[19] The window type air conditioner according to the present invention further comprises: a condensing water dispersing unit mounted at the outdoor centrifugal fan for dispersing condensing water collected at the lower surface of the case to the outdoor heat exchanger.

[20] The condensing water dispersing unit is composed of a dispersion ring connected to the outdoor centrifugal fan thus to be rotated together for dispersing the condensing water.

Description of Drawings

- [21] FIG. 1 is a disassembled perspective view showing a window type air conditioner in accordance with the conventional art;
- [22] FIG. 2 is a sectional view showing the window type air conditioner in accordance with the conventional art;
- [23] FIG. 3 is a disassembled perspective view showing a window type air conditioner according to one embodiment of the present invention;
- [24] FIG. 4 is a sectional view showing the window type air conditioner according to one embodiment of the present invention;
- [25] FIG. 5 is a partial section view showing an outdoor unit of a window type air conditioner according to another embodiment of the present invention; and
- [26] FIG. 6 is a frontal view showing an outdoor centrifugal fan of the window type air conditioner according to another embodiment of the present invention.

Best Mode

- [27] Hereinafter, a window type air conditioner according to the present invention will be explained with reference to the attached drawings.
- [28] Even if a plurality of preferred embodiments can exist in the present invention, the most preferred embodiment will be explained hereinafter.
- [29] FIG. 3 is a disassembled perspective view showing a window type air conditioner according to one embodiment of the present invention, and FIG. 4 is a sectional view showing the window type air conditioner according to one embodiment of the present invention.
- [30] The window type air conditioner according to the present invention comprises: a case 10 formed at the wall that divides the indoor side and the outdoor side; an indoor unit 20 positioned at the indoor side of the case 10 thus to be heat-exchanged with the indoor air; an outdoor unit 30 positioned at the outdoor side of the case 10 thus to be heat-exchanged with the outdoor air; a compressor 40 for compressing a refrigerant; and etc.
- [31] One side of the case 10 is positioned at the indoor side and another side thereof is positioned at the outdoor side. A division plate 42 for dividing the indoor unit 20 and the outdoor unit 30 is installed in the case 10, and a driving motor 44 is mounted at the division plate 42.
- [32] An indoor air suction port 12 for sucking the indoor air and an indoor air discharge port 14 for discharging the air that has been heat-exchanged while passing through the indoor unit 20 indoors are separately formed up and down at the front surface of the case 10 positioned at the indoor side. Also, an outdoor air suction port 16 for sucking

the outdoor air is formed at both lateral surfaces of the case 10 positioned at the outdoor side, and an outdoor air discharge port 18 for discharging the air that has passed through the outdoor unit 30 outdoors is formed at the rear surface of the case 10.

[33] The indoor unit 20 is composed of: an indoor heat exchanger 22 for passing the indoor air and thereby cooling; and an indoor centrifugal fan 24 opposite to the indoor heat exchanger 22 and connected to one side of the driving motor 44, for generating a blowing force so that the indoor air sucked into the indoor air suction port 12 can pass through the indoor heat exchanger 22.

[34] The indoor centrifugal fan 24 is mounted in a shroud 26, an orifice 28 for a smooth air flow is formed between the indoor centrifugal fan 24 and the indoor heat exchanger 22. An air guide 46 for guiding the air that has passed through the indoor centrifugal fan 24 to the indoor air discharge port 14 is formed at the upper side of the shroud 26.

[35] The outdoor unit 30 is composed of: an outdoor heat exchanger 32 connected to the compressor by a refrigerant pipe 48 and heat-exchanged by the outdoor air; and an outdoor centrifugal fan 34 opposite to the outdoor heat exchanger 32 and connected to another side of the driving motor 44, for generating a blowing force to blow the outdoor air sucked into the outdoor air suction port 16 to the outdoor heat exchanger 32.

[36] A shroud 36 in which the indoor centrifugal fan 34 and the indoor heat exchanger 32 are mounted is installed inside the case 10 positioned at the outdoor side. Also, an orifice 38 for smoothly flowing the air sucked into the outdoor air suction port 16 to the outdoor centrifugal fan 34 is mounted at an entrance of the shroud 36.

[37] The orifice 38 is provided with an air guide 50 for guiding the air blown from the outdoor centrifugal fan 34 to the outdoor heat exchanger 32.

[38] The outdoor centrifugal fan 34 is a fan for constantly maintaining a blowing force even if a flow channel resistance is great, and is composed of: a hub 54 connected to the driving motor 44 by a rotational shaft 52; blades 56 formed at the outer side of the hub in a circumferential direction with the same interval for generating a blowing force; and a supporting ring 58 integrally formed between the blades for supporting the blades.

[39] FIG. 5 is a partial section view showing an outdoor unit of a window type air conditioner according to another embodiment of the present invention, and FIG. 6 is a frontal view showing an outdoor centrifugal fan of the window type air conditioner according to another embodiment of the present invention.

[40] In the outdoor unit 30 of the window type air conditioner according to another embodiment of the present invention, a condensing water dispersing unit 70 for lifting condensing water contained in the lower surface of the case 10 and thereby dispersing to the outdoor heat exchanger 32 is formed at one side of the outdoor centrifugal fan 34.

[41] That is, the condensing water dispersing unit 70 is composed of: a supporting rib 64 connected to the outer side of the outdoor centrifugal fan 34 with a constant interval; and a dispersion ring 62 integrally connected to the end of the supporting rib 64 for dispersing condensing water.

[42] The dispersion ring 62 is formed as a circular ring type, and the outer side surface thereof is in contact with the condensing water thus to be rotated with the centrifugal fan 34 when the centrifugal fan 34 is rotated, thereby dispersing condensing water to the outdoor heat exchanger 32.

[43] As another embodiment of the condensing water dispersing unit 70, the condensing water dispersing unit 70 may be composed of a dispersion ring of a ring shape respectively connected to edges of the blades 56 by a connection rib.

[44] Operation of the window type air conditioner according to the present invention will be explained as follows.

[45] When a power source is applied to the air conditioner, the compressor is driven thus to circulate a refrigerant and to drive the indoor centrifugal fan and the outdoor centrifugal fan.

[46] At this time, the indoor unit 20 is operated as follows. As the indoor centrifugal fan 24 is driven, the indoor air is sucked into the case 10 positioned at the indoor side through the indoor air suction port 12 formed at the lower side of the front surface of the case 10 thus to be cooled while passing through the indoor heat exchanger 22. The cooled air is guided by the air guide 46 thus to be discharged to indoors through the indoor air discharge port 14 formed at the upper side of the front side of the case 10.

[47] Also, the outdoor unit 30 is operated as follows. As the outdoor centrifugal fan 34 is driven, the indoor air is sucked into the case 10 positioned at the outdoor side through the outdoor air suction port 16 formed at both lateral surfaces of the case 10 thus to be heat-exchanged while passing through the outdoor heat exchanger 32. The heat-exchanged air is discharged to outdoors through the outdoor air discharge port 18 formed at the rear side of the case 10.

[48] Herein, since the outdoor centrifugal fan 34 is applied to the outdoor unit 30 in the same manner that the indoor centrifugal fan 24 is applied to the indoor unit 20, an air

volume lowering can be prevented even if a flow channel resistance is increased.

According to this, a suction space into which the outdoor air is sucked is reduced thereby to reduce the entire size of the compressor.

[49] In case that the condensing water dispersing unit 70 is applied to the outdoor centrifugal fan 34, condensing water is generated on the surface of the outdoor heat exchanger 32 by a temperature difference. The condensing water falls down thus to be collected into the lower portion of the case 10. Then the condensing water is dispersed to the outdoor heat exchanger 32 by the condensing water dispersing unit 70 thereby to lower the temperature of the outdoor heat exchanger 32.

[50] That is, when the outdoor centrifugal fan 34 is rotated, the dispersion ring 62 connected to the outdoor centrifugal fan 34 by the supporting ring 64 is together rotated thereby to lift up the condensing water contained in the lower portion of the case 10 and to disperse to the outdoor heat exchanger 32.

[51] In the window type air conditioner according to the present invention, the indoor centrifugal fan that the air volume is not lowered even if the flow channel resistance is increased is installed at the outdoor unit. According to this, the suction space inside the case positioned at the outdoor side to which the outdoor air is sucked is reduced thereby to reduce the entire size of the compressor.

[52] Also, the dispersion ring is installed at the outdoor centrifugal fan thus to disperse condensing water to the outdoor heat exchanger. According to this, the temperature of the outdoor heat exchanger is lowered faster thus to enhance the function of the air conditioner.

[53] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.